IN THE U.S. PATENT AND TRADEMARK OFFICE

APPLICANT: Kazuhiro Wataya et al.

SERIAL NO.: 10/092,503

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FOR: Thermal Spray Spherical Particles, and Sprayed Components

GROUP: 1773

EXAMINER: AHMED, SHEEBA

D E C L A R A T I O N

Honorable Commissioner of Patents and Trademarks
Washington, D.C. 20231

Sir,

I, Takao Maeda, resident of c/o Magnetic Materials Research Center, Shin-Etsu Chemical Co., Ltd., 2-1-5, Kitago, Takefu-shi, Fukui-ken, Japan do hereby declare that:

1. I was graduated from Faculty of Engineering, Nagaoka University of Technology, Japan in March 1989. Since April 1989, I have been employed by Shin-Etsu Chemical Co., Ltd., the assignee of the above-identified

application. I have been engaged in research and development relating to rare earth materials and ceramics in the laboratory of the Company.

2. I am one of the named inventors of the above-identified application and hence, am familiar with the subject matter disclosed in said application.

3. In order to show the feature of the present invention, I conducted the following experiments.

[Experiment]

Experiment 1

10 g of methyl cellulose was added to 5 kg of yttrium oxide having a Fisher diameter of 0.45 μm, to which deionized water was added to give an approximately 40 wt% aqueous slurry. The aqueous slurry was sprayed by a spray dryer, forming granules having an average particle diameter of about 50 μm.

The granule powder was fired in an electric furnace having an air atmosphere at 1,600° C for 2 hours and cooled. The thus obtained powder was passed through a sieve with an opening of 150 μm, obtaining a thermal spray powder of spherical particles having an average particle diameter of 50 μm. The particles had a breaking strength of about 13 MPa, when measured using a planar indenter at a testing load of 980 mN and a load applying rate

of about 41.5 mN/sec, and had a bulk density of 1.86 g/cm^3.

Note that the average particle diameter and breaking strength of the particles are determined in the same manner as disclosed on page 6 in the present specification.

Comparison No. 1

The same procedure was conducted as disclosed in Example 1 of Tajima (USP 5,061,560), and a slurry containing Y_2O_3 powder and ammonium carboxymethyl cellulose was obtained. The slurry was then put through a spray drier and agglomerated. The spray drying conditions were as follows:

slurry feed rate	2 kg/hr
disk diameter	55 mm ϕ
disk speed	12,000 rpm
hot air temperature	72° C
hot air flow rate	4 m^3/min

The thus agglomerated spherical grains had a mean grain diameter of 49.5 μm, and a breaking strength of less than 1 MPa, when measured using a planar indenter at a testing load of 980 mN and a load applying rate of about 41.5 mN/sec. The bulk density of the grains was 1.80 g/cm^3.

Table I summarizes the results obtained in Experimental 1 and Comparison 1.

Table I

	Starting powder type	Particles obtained		
		Average particle diameter (μm)	Bulk density (g/cm^3)	Breaking strength (MPa)
Experiment 1 (Invention)	Y_2O_3	50.0	1.86	13
Comparison 1 (Tajima)	Y_2O_3	49.5	1.80	< 1

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Dated this 31st day of January , 2005

Takao Maeda